How to Build, Implement, and Use an Architecture Metamodel

SATURN 2013
Software Architecture Conference
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Armstrong Process Group, Inc.
www.aprocessgroup.com
Objectives

- Review industry standard for architecture descriptions
  - Stakeholders, concerns, viewpoints, and views
- Introduce method for defining architecture viewpoints based on stakeholder scenarios and concerns
  - Based on Architecture Description UML Profile
- Describe techniques for designing custom metamodel for rendering required architecture views
About APG

- APG’s mission is to
  "Align information technology and systems engineering capabilities with business strategy using proven, practical processes delivering world-class results."

- Industry thought leader in enterprise architecture, business modeling, process improvement, systems and software engineering, requirements management, and agile methods

- Member and contributor to
  - UML, SysML, SPEM, UPDM at the Object Management Group (OMG)
  - TOGAF and ArchiMate at The Open Group
  - Eclipse Process Framework (EPF) at the Eclipse Foundation

- IBM Advanced Business Partner

- Sparx Systems Value-Added Reseller
Describes the “Who”, “Why”, “What” and “How” for architecture modeling
Gather Modeling Requirements – Workflow

Identify Architecture Stakeholders → Interview Architecture Stakeholder → Elicit Architecture Scenarios → Describe Architecture Concerns → Identify Architecture Viewpoints

Design Architecture Viewpoint → Update Architecture Metamodel → Store Viewpoint → Retrieve Viewpoint

Viewpoints Selected

Viewpoint does not exist
Describe Stakeholders and Scenarios

- «Architecture Stakeholder»
  - Solution
  - Architecture Manager

- «Architecture Stakeholder»
  - Application Owner

- «Architecture Scenarios»
  - Understand Projects Impact on Application Landscape

- «Architecture Scenarios»
  - Develop Project Architecture Blueprint

- «Architecture Scenarios»
  - Understand Current Application Architecture Landscape

- «Architecture Scenarios»
  - Understand Target Application Architecture Landscape

«defines»

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Describe Architecture Concerns

- Which applications are impacted by this project?
- What is the anticipated impact of this project on each application?
- In the context of this project, which applications interact with which other applications?
- What is the nature of the interactions amongst the applications within scope of this project?
- Which interactions between applications are impacted by this project?
- What are the proposed changes to existing application interactions?
- Which interactions are being removed by this project?
- Which interactions are being added by this project?
Identify Architecture Viewpoints

Which applications are impacted by this project?

What is the anticipated impact of this project on each application?

In the context of this project, which applications interact with which other applications?

What is the nature of the interactions amongst the applications within scope of this project?

Which interactions between applications are impacted by this project?

What are the proposed changes to existing application interactions?

Which interactions are being removed by this project?

Which interactions are being added by this project?

notes

Viewpoint Type: Grid
Modeling Language: N/A
Required Elements: Application, Project
Required Attributes: Application.Name, Application.Owner, Application.ProjectImpactType, Project.Name
Required Relationships: Project Impacts Application
Constraints: Applications impacted by specified Project
Alternate Depiction: Show using extended UML Class diagram with Applications and Projects and their relationships.

notes

Viewpoint Type: Diagram
Modeling Language: UML Component
Required Elements: Application
Required Attributes: Application.Name, Application.ProjectImpactType, ApplicationInteraction.InteractionType, ApplicationInteraction.ProjectImpactType
Required Relationships: Application Interacts With Application
Constraints: Applications impacted by specified Project
Display Notes:
- Emphasize project impact for each application by changing application border color/width
- Emphasize application interaction types with different line styles
Update Architecture Metamodel

Application Interaction
- Interaction Type: Application Interaction Type
  - Batch
  - Real-Time

Application
- Name: text
- Description: memo
- SOX Compliance: Yes/No
- Target Lifecycle State: Application Lifecycle State
- Business Criticality: Business Criticality Level

Person
- First Name: text
- Last Name: text
- Phone Number: text
- Email Address: text

Project Application Impact
- Project Impact Level: Project Application Impact Level
  - No Impact
  - Validate Impact
  - Verify Impact
  - Impacted

Project Interaction Impact
- Project Impact Type: Project Application Interaction Impact Type
  - Impacted
  - Added
  - Removed
  - Not Impacted

Project
- Name: text
- Description: int
- Start Date: date
- End Date: date

Application
- 0..* interacts with
- 0..* owned by
- 1..* impacts
- 0..*

Person
- 1
- 1

Project
- 0..*
- has project manager
- has architect

Application Interaction Type
- «enumeration»
- Batch
- Real-Time

Project Application Impact Level
- «enumeration»
- No Impact
- Validate Impact
- Verify Impact
- Impacted

Project Interaction Impact Type
- «enumeration»
- Impacted
- Added
- Removed
- Not Impacted

Business Criticality Level
- «enumeration»
- Safety-critical
- Mission-critical
- Essential
- Regular
- Non-critical
Conclusion

- Exploit existing architecture standards for determining how to model (and how much) for what purpose
- Use conventional modeling techniques for understanding stakeholder concerns and designing architecture viewpoints
  - And for designing custom metamodel
- Implement custom metamodel using UML profiles
  - Basis for consistent semantics and tool usage
Q&A

Thanks for your attention and participation!

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